INSECT TRAP

FIELD OF THE INVENTION

The present invention relates to fishing, trapping, and vermin destroying; and, more particularly, to traps having an entrance so made that, once an insect is inside, it is difficult for the insect to return by that entrance.

BACKGROUND

Various traps have been devised over the years to rid an area of insect pests. Some of these traps contain poisons that are inappropriate for use around children or in gardens that are sensitive to even small amounts of pollutants. Other traps use a light to attract and then electrocute an insect. While effective, the associated sound is not pleasant, and the resulting debris must be frequently collected. U.S. Patent No. 6,158,165 describes an insect trap that avoids both poisons and electrocution, but is for use with larger insects, such as cockroaches. The '165 device has a ring of interleaving wires surrounding an opening in a container. Insects push aside the wires in one direction to enter the container, but are prevented from escaping from the wires by going in the reverse direction. While such a device is useful for insects that are strong enough or heavy enough to push the interleaved wires apart, it is ineffective for those insects, such as moths, that are not.

Thus, a need exists for an insect trap that avoids poison and electrocution, but is effective in collecting lighter subjects, such as winged insects. The ideal device would have a one-way entrance so that, once an insect is inside, it is difficult for the insect to return by that entrance. Further, the device should be useful in catching insects that are not particularly large, strong, or heavy.

SUMMARY OF THE INVENTION

The present invention is an insect trap having a container, a whisker assembly, a light assembly, and a chemical attractant. The container defines a volume. An opening connects regions external to the trap with regions in the volume. The whisker assembly is located at the opening and includes a plurality of flexible strands that extend into the volume. The light assembly includes one or more light bulbs to direct light onto the flexible strands. The chemical attractant is located within the volume. During use, the light bulb attracts and draws a subject to the trap and the chemical attractant further lures the subject into the volume. The arrangement of the whisker assembly allows the subject to enter the volume, but not to easily exit the volume.

In accordance with aspects of this invention, there are many different variations possible in the formation of the whisker assembly. In one embodiment, the flexible strands are arranged in a conical or frustoconical manner. In another embodiment, the flexible strands are formed having multiple sections. There are also multiple variations possible in the flexible strands used in the whisker assembly. In preferred embodiments, the flexible strands are made of a material that is readily bent, such as a nonmetal material. In some embodiments, the flexible strands are made from a luminous material, a reflective material, or a light-conductive material. Example materials include polypropylene, Nylon, acrylic, and ethylene vinyl acetate.

In accordance with other aspects of this invention, if using light-conductive flexible strands, the light assembly can provide a secondary light attractant at the tip ends of the strands. In addition, arrangements may be made in which the strands direct the light onto a distant surface, such as the container wall.

In accordance with further aspects of this invention, the light assembly emits a blue light that is particularly useful for trapping moths. The light assembly may also include an optional photosensitive device arranged to turn the assembly on and off according to whether it is daylight or night.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a perspective view of one embodiment of an insect trap formed in accordance with the present invention;

FIGURES 2 and 3 are side views of alternative embodiments of a whisker assembly formed in accordance with the present invention;

FIGURES 4 and 5 are perspective views of still further embodiments of a whisker assembly formed in accordance with the present invention; and

FIGURE 6 is a perspective view of another embodiment of a trap formed in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is an environmentally friendly trap 10 useful for catching insects, particularly winged insects, such as moths. Various embodiments of this invention are described. In general, the most desirable configuration will depend upon the insect sought to be caught.

FIGURE 1 illustrates one embodiment useful for trapping moths. The trap 10 includes a container 12, a whisker assembly 14, a conventional (chemical) attractant 16 located within the container, and a light assembly 18. The container 12 has separable top and bottom portions, 20 and 22, respectively. The top portion 20 is located at the container's upper end 24. The bottom portion 22 defines a volume 26. An opening 28 is located in the bottom portion to provide a passageway between regions that are external to the trap and regions that are internal to the volume 26.

The whisker assembly 14 is located at the opening 28 and extends into the volume 26. The primary goal of the whisker assembly is to allow subjects to enter the volume, but not exit the volume. During use, the light assembly 18 attracts an insect to the trap. Because light can travel much farther than a chemical attractant alone, the trap is effective over a wide area. Once the insect is near the trap, the insect picks up the scent of the attractant. The moth moves toward the attractant by passing through the whisker assembly 14 and into the volume 26.

In more detail and still referring to the embodiment of FIGURE 1, the whisker assembly 14 includes a plurality of flexible strands 30 arranged in a conical manner. The placement of the tips of the strands defines a second opening having a diameter less than the wingspan of the insect. The base of the strands are connected to the container at the opening 28. In this arrangement, the flexible strands are integrally formed with the container. Alternatively, as shown in FIGURES 2-4, the bases of the stands are affixed to a ring 32 that connects to the opening 28.

Referring back to FIGURE 1, the tips of the strands are located near one another, though in this arrangement, in a noncontacting relation. The strands are made of a flexible material, e.g., polypropylene, Nylon, acrylic, and ethylene vinyl acetate. The strands should be flexible enough to allow the particular desired subject to enter the volume, though stiff enough to prohibit the subject from exiting the volume. The angle of the cone will also affect the difficulty for the insect to escape. A shallower angle (see FIGURE 3) will increase the chances of the strands bending inward if contacted, and hence working to keep the insect trapped. A steeper slope (see FIGURE 4) will have the opposite effect. Similarly, a designer should consider the strands' ability to flex according to the trapping needs of the target insect.

There are numerous other variations possible for the whisker assembly that may be used and tailored to a particular insect. For example, the strands may be the same length, with tip ends being spaced in a tight, circular, noncontacting path. See FIGURE 1. The base of the strands could be oriented at an angle to give the strands a swirled effect. See FIGURE 1. The strands may be arranged in a random, disorganized manner, with some strands contacting each other and some not. See FIGURE 2. The arrangement of FIGURE 3 includes strands that are of varying lengths and arranged to result in a shallow overall cone height. FIGURES 4 and 5 illustrate whisker assemblies having multisectioned strands 30. FIGURE 4 has V-shaped sections 31 attached end to end along each strand. The strands of FIGURE 5 have a main stem and one or more inwardly oriented arms 33. In many embodiments, the preferred shape of the plurality of flexible strands will be linear strands arranged in a conical or frustoconical configuration, but a nonconical passage of curled or kinked hair-like flexible strands could be made to work as well.

Referring back to FIGURE 1, the light assembly 18 includes one or more light bulbs 40 attached to the top portion 20 of the container 12, near the opening 28. As used herein, the term "light bulb" means a device that is capable of emitting electromagnetic radiation in the visible spectrum, e.g., incandescent, LED, LCD, flame, etc. A preferred light bulb for use with moths is a low-voltage LED that emits blue light. In general, bulbs that emit light with a frequency in the range of about 380 to about 565 nanometers are of value in trapping moths. Still referring to FIGURE 1, the light assembly 18 includes an optional photosensitive device 42 capable of turning the bulb off during daylight and turning the bulb on at night. A battery 44 provides electric current.

The light assembly 18 is used to lure insects that are attracted to light. In addition, the bulb may be positioned at a location that directs light into the flexible strands, thus illuminating the strands and creating an additional attractant for the moths to enter into the volume.

In one embodiment, the strands are formed from a luminous or light-reflective material. Luminous materials allow light to be partially reflected and to partially pass through the material. This gives the luminous material a soft glowing effect. A light-reflective material generally reflects all light that hits it. Alternatively, various optical effects can be created using light-conductive strands. For example, if light is directed onto the base of a fiber-optic type of strand, the light will be visible at the tip ends of the strands, further drawing the insect into the volume. The strands may also be arranged to direct or focus their light onto a distant surface, such as the distant container wall, thus providing yet another light lure for the insect. The opposite approach may be used instead, where the flexible strands are clear and not readily discernible to the insect. Thus, as will be appreciated from the various approaches possible, the flexible strands 30 can be formed from any of a number of known materials. Example strands include, but are not limited to, nylon filaments, hollow rubber tubes, polypropylene, Nylon, acrylic, and ethylene vinyl acetate, etc. In most embodiments, particularly those for use with moths, the flexible strands will be made of a nonmetal material.

Referring to FIGURE 6 is yet another embodiment of a trap formed in accordance with the present invention. In this embodiment, the light bulb is located within the volume and the whisker assembly is circumferentially located between the upper and

lower portions. As will be appreciated from a reading of the above, there are many different arrangements possible, within the scope of the invention as claimed herein.

While the preferred embodiment of the invention has been illustrated and described, it will be appreciated that various changes can be made therein without departing from the spirit and scope of the invention. For example, for some insect traps, it may be helpful to use a timed attractant or a release mechanism to control the intensity of the attractant's release. Such features will in large part depend on the subject sought to be caught.